Ashley M. Gjovik, JD
In Propria Persona
2108 N St. Ste. 4553
Sacramento, CA, 95816
(408) 883-4428
legal@ashleygjovik.com

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

ASHLEY M. GJOVIK, *an individual*,

Plaintiff,

vs.

APPLE INC., a corporation,

Defendant.

Case No. 3:23-CV-04597-EMC

PLAINTIFF'S REQUEST FOR JUDICIAL NOTICE

In Support of Plaintiff's Opposition to Defendant's Motions to Dismiss & to Strike

Motion Hearing & Case Management Conference:
Dept: Courtroom 5 (Zoom)
Judge Edward M. Chen
Date: August 22, 2024
Time: 1:30 PM PT

Table of Contents

Contents

I. Table of Authorities

Cases

Other Authorities

Rules

Treatises

Regulations

Points & Authorities

1. Plaintiff Ashley Gjovik respectfully requests, pursuant to Fed. R. Civ. E. 201, that the Court take judicial notice of the following of the public records described below and attached as Exhibits. Plaintiff submits this Memorandum of Points and Authorities concurrently with her Oppositions to both motions and also a Declaration providing authentication for the Exhibit and additional procedural context.

2. This request is in support of Plaintiff's Opposition to Defendant's fourth Fed. R. Civ. P. 12(b)(6) Motion to Dismiss and third Fed. R. Civ. P. 12(f) Motion to Strike at Docket No's 78 and 79. The hearing is scheduled for August 22, 2024. All of the exhibits in this request support Plaintiff's Private Nuisance, Ultrahazardous Activities, and IIED related to 3250 Scott Blvd, Santa Clara, California – and more indirectly, also her 2020-2021 whistleblowing about the site.

3. A court may take judicial notice of facts not subject to reasonable dispute and can be accurately and readily determined from sources whose accuracy cannot reasonably be questioned. Federal Rules of Evidence 201(b); *Adetuyi v. City & Cnty. of San Francisco*, 63 F. Supp. 3d 1073, 1080–81 (N.D. Cal. 2014).

II. Arguments

4. Judicial notice under Rule 201 permits a court to notice an adjudicative fact if it is "not subject to reasonable dispute." Fed. R. Evid. 201(b). A fact is "not subject to reasonable dispute" if it is "generally known," or "can be

accurately and readily determined from sources whose accuracy cannot reasonably be questioned." Fed. R. Evid. 201(b)(1)– (2). Accordingly, "[a] court may take judicial notice of matters of public record without converting a motion to dismiss into a motion for summary judgment." *Khoja v. Orexigen Therapeutics, Inc.*, 899 F.3d 988, 999 (9th Cir. 2018).

5. A matter that is properly the subject of judicial notice may be considered along with the complaint when deciding a motion to dismiss for failure to state a claim. *Skilstaf, Inc. v. CVS Caremark Corp.,* 669 F3d 1005, 1016, fn. 9; (9th Cir. 2012). Therefore, on a motion to dismiss a court may properly look beyond the complaint to matters of public record and doing so does not convert a Rule 12(b)(6) motion to one for summary judgment. *Mack v. S. Bay Beer Distribs., Inc.,* 798 F.2d 1279, 1282 (9th Cir. 1986).

6. The court need not accept as true allegations that contradict facts that may be judicially noticed by the court. *Von Saher v. Norton Simon Museum of Art at Pasadena* 592 F3d 954, 960, (9th Cir. 2010). Further, if the Court takes judicial notice of facts that contradict allegations in an Answer or Motion to Dismiss, the Court need not accept those allegations could be true. *Mullis v. U.S. Bankr. Ct. for Dist. of Nev.*, 828 F.2d 1385, 1388 (9th Cir. 1987).

7. A party requesting judicial notice of material must provide the court and each party with a copy of the material. This efiled motion for judicial notice includes the Exhibits noted, and Each document that was posted online is marked with the uniform resource locator (URL) and date accessed. *HsingChing Hsu v.*

Puma Biotechnology, Inc., slip op. at 7. 8:15-cv-00865 (C.D. Cal. Sept. 30, 2016).

A. Legal & Government Records (Exhibits A, B, E, G, N, O).

8. The Court may take judicial notice of letters from agencies related to environmental matters. See, e.g., *Alliance for the Wild Rockies v. Savage*, 897 F.3d 1025, 1032 n.11 (9th Cir. 2018) (in Endangered Species Act case, reviewing court notices USFS letter requesting re-consultation with Fish and Wildlife Service before approving forest management project). The Court may take judicial notice of records related to permits See, e.g., *Massachusetts v. Westcott*, 431 U.S. 322, 97 S. Ct. 1755, 52 L. Ed. 2d 349 (1977) (records of the Vessel Documentation Division of the Coast Guard that an individual's vessel is enrolled and licensed); *Olympic Forest Coalition v. Coast Seafoods Co.,* 884 F.3d 901, 904 (9th Cir. 2018) (reviewing court notices letter from Washington Department of Ecology to defendant about pollution discharge permit).

9. A court may take judicial notice of consent orders between private parties and environmental agencies related to hazardous waste liability. See, e.g., *Niagara Mohawk Power Corp. v. Chevron U.S.A., Inc*., 596 F.3d 112, 124 (2d Cir. 2010) (noticing consent order executed by property owner and state Department of Environmental Conservation indicating release of CERCLA liability). A court may take judicial notice of agency reports that are "factual findings resulting from an investigation made pursuant to authority granted by law" and which suggest a pattern of violations with a company's day-to-day operations. *United States v. Ramirez-Jiminez*, 967 F.2d 1321, 1326 (9th Cir. 1992).

10. A formal US EPA RCRA Inspection report is included as Exhibit A (separate PDF). This is a true and correct copy from the US EPA Region 9 Enforcement and Compliance group, released via FOIA as noted on the exhibit. This is the initial report of the inspections conducted by US EPA due to my disclosures in June 2023. Any enforcement action comes later. The findings in the report support all of the toxic tort claims. This document is incorporated in the Fourth Amended Complaint on page 45, ¶ 151.

11. A court may take judicial notice of the decisions of state administrative boards, such as the public utilities commission. See, Utility *Reform Network v. Public Utilities Commission,* 223 Cal. App. 4th 945, 167 Cal. Rptr. 3d 747 (1st Dist. 2014); *Dollar-A-Day Rent-A-Car Systems, Inc. v. Pacific Tel. & Tel. Co.*, 26 Cal. App. 3d 454, 102 Cal. Rptr. 651 (2d Dist. 1972) – or the State Water Resources Control Board. See, *Young v. State Water Resources Control Board,* 219 Cal. App. 4th 397, 161 Cal. Rptr. 3d 829 (3d Dist. 2013), as modified, (Sept. 20, 2013); *State Water Resources Control Bd. Cases,* 136 Cal. App. 4th 674, 39 Cal. Rptr. 3d 189 (3d Dist. 2006).

12. A court may take judicial notice of decisions of local bodies, such as county boards of zoning adjustments and county boards of supervisors. See, *Center for Biological Diversity, Inc. v. FPL Group, Inc.,* 166 Cal. App. 4th 1349, 83 Cal. Rptr. 3d 588 (1st Dist. 2008), as modified on denial of reh'g, (Oct. 9, 2008) – or the Department of Public Health. See, *Arroyo v. Plosay,* 225 Cal. App. 4th 279, 170 Cal. Rptr. 3d 125 (2d Dist. 2014) (issuance of license) – or the Division of Labor

Standards Enforcement. See, *Church v. Jamison,* 143 Cal. App. 4th 1568, 50 Cal. Rptr. 3d 166 (5th Dist. 2006) (manual and opinion letter) – or a county planning commission. See, *Watson v. Los Altos School Dist.,* Santa Clara County, 149 Cal. App. 2d 768, 308 P.2d 872 (1st Dist. 1957).

13. A copy sections of the International Fire Code, International Zoning Code, and California Fire Code are attached in Exhibit O (separate PDF). These guides explain policy and an prioritization of hazards for semiconductor fab.

14. A court may take judicial notice of city and county ordinances, codes, and similar legislative enactments. See, *City of Palm Springs v. Luna Crest Inc.,* 245 Cal. App. 4th 879, 200 Cal. Rptr. 3d 128 (4th Dist. 2016) (city municipal code); *League of California Cities v. Superior Court,* 241 Cal. App. 4th 976, 194 Cal. Rptr. 3d 444 (4th Dist. 2015) (city administrative regulation); *Tower Lane Properties v. City of Los Angeles,* 224 Cal. App. 4th 262, 168 Cal. Rptr. 3d 358 (2d Dist. 2014) (municipal code); *City of Monterey v. Carrnshimba,* 215 Cal. App. 4th 1068, 156 Cal. Rptr. 3d 1 (6th Dist. 2013) (city ordinances); *Stockton Citizens for Sensible Planning v. City of Stockton,* 210 Cal. App. 4th 1484, 149 Cal. Rptr. 3d 222 (3d Dist. 2012) (municipal code); *Madain v. City of Stanton,* 185 Cal. App. 4th 1277, 111 Cal. Rptr. 3d 447 (4th Dist. 2010) (municipal code); *Curcini v. County of Alameda*, 164 Cal. App. 4th 629, 79 Cal. Rptr. 3d 383 (1st Dist. 2008) (county administrative code and salary ordinance).

B. News Articles; Publications (Exhibits A, C, D, F, H-N)

15. The Court may take judicial notice of the coverage and existence of

newspaper and magazine articles. See, e.g., *Washington Post v. Robinson*, 935 F.2d 282, 291 (D.C.Cir.1991) (allowing judicial notice of the existence of newspaper articles); *Jackson v. Godwin*, 400 F.2d 529, 536 (5th Cir.1968) (finding that newspapers and magazines allowed in a prison carried extensive coverage of riots to the point where the district court could take judicial notice of such coverage); *Farah v. Esquire Magazine*, 736 F.3d 528, 534 (D.C. Cir. 2013) (in defamation action, noticing publicly available historical articles attached to defendant publisher's motions to dismiss). Newspapers or publications, and official publications, are self-executing records. Fed. R. Civ. E. 902.

16. Copies of several news articles are attached as Exhibits D, F, H, I, J, K, L, and M. True and correct copies are included as provided from the San José State University Library Special Collections & Archives. These articles support all of the toxic tort claims, support the prior finding of law related to ultrahazardous activities, and do not align with Defendant's attempted arguments.

C. Science & Medicine (Exhibits C, E, N, O).

17. Courts take judicial notice of scientific facts and propositions, *McAllister v. Workmen's Compensation Appeals Bd.,* 69 Cal. 2d 408, 71 Cal. Rptr. 697, 445 P.2d 313 (1968) (that smoke is visible because it contains incompletely oxidized materials). Well-known physical and chemical characteristics of substances will be judicially noticed. *People v. Arthur,* 1 Cal. App. 2d Supp. 768, 32 P.2d 1002 (App. Dep't Super. Ct. 1934) (uses of hydrogen peroxide). Judicial notice may be taken of the deleterious effect of certain chemical elements on the

tissues, flesh, and organs of the human body. *Katz v. Helbing,* 205 Cal. 629, 271 P. 1062, 62 A.L.R. 825 (1928).

18. An article from Semiconductor International is included as Exhibit C, explaining the known dangers of many of the gases specific to semiconductor fab. An academic "worst case scenario" planning article drafted by San Jose State University professors for the Santa Clara County Fire Chief's Association to use in drafting toxic gas ordinances is included as Exhibit N. Copies of current World Health Organization, INCHEM, International Chem Safety Cards for six of the toxic gases specific to semiconductor fabrication are included as Exhibit E. The example gases include: Arsine, Phosphine, Stibine, Fluorine, Diborane, and Silane. Four of these six gases include a warning to avoid all human contact, noting no amount of exposure is safe, and any exposure requires medical treatment. All of these exhibits support the toxic tort claims, especially Ultrahazardous Activities.

D. Maps & Locations (Exhibit B)

19. The Court may take judicial notice of geographic locations and distances between locations. *United States v. Coutchavlis,* 260 F.3d 1149, 1153–54 (9th Cir. 2001). *Tahoe Forest Inn v. Superior Court,* 99 Cal. App. 3d 509, 160 Cal. Rptr. 314 (3d Dist. 1979). The court may examine historical data, maps, and public records. *People v. Stralla,* 14 Cal. 2d 617, 96 P.2d 941 (1939).

20. Judicial notice may be taken of topography and geographical facts. See, *Mogle v. Moore,* 16 Cal. 2d 1, 104 P.2d 785 (1940); *City of Oakland v. Williams,*

15 Cal. 2d 542, 103 P.2d 168 (1940); *People v. Hosney,* 204 Cal. App. 2d 584, 22 Cal. Rptr. 397 (2d Dist. 1962). A court will take judicial notice for example of overcrowded conditions in some localities. See, *City of San Diego v. Van Winkle,* 69 Cal. App. 2d 237, 158 P.2d 774 (4th Dist. 1945); *Kelly v. City of San Diego,* 63 Cal. App. 2d 638, 147 P.2d 127 (4th Dist. 1944).

21. Included as Exhibit B are four maps of 3250 Scott Blvd. The first shows an aerial view of the facility next to the apartments, from the city's official website. The second is the County's official property record for the site, with an image identifying the building. The third and fourth images show Google's "measure distance" from the factory to the apartments, from curb to curb, and from building to building.

III. CONCLUSION

22. I verified the authenticity of each of these documents. A true and correction version of each document is attached in each exhibit. I declare under penalty of perjury this is true and correction.

Dated: July 30, 2024.

Signature:

/s/ Ashley M. Gjovik

Pro Se Plaintiff

Email: legal@ashleygjovik.com

Physical Address:
Boston, Massachusetts

Mailing Address:
2108 N St. Ste. 4553 Sacramento, CA, 95816

Phone: (408) 883-4428

IV. APPENDIX: EXHIBITS

EXHIBIT NO.	RECORD DESCRIPTION	ASSOCIATED CLAIMS
EXHIBIT A (SEPARATE PDF)	US EPA RCRA Inspection Report for 3250 Scott Blvd	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT B	Map: Location of 3250 Scott Blvd Santa Clara, CA, 95054.	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT C	Hazardous Production Gases	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT D	*Silicon Valley toxics pose a 'Bhopal' peril*	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT E	ICSC for: Arsine, Phosphine, Stibine, Fluorine, Diborane, Silane	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT F	San Jose Mercury News, LSI LOGIC advertisement.	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT G	Letter from California Assemblymember Connelly	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT H	*Warning to Silicon Valley on computer chip gases*	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT I	*Activist calls semiconductor industry history's most dangerous*	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT J	*Blast scene 'pretty brutal'*	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT K	*Residents flee homes in fear of new blast*	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT L	*Toxic gas leak is 'inevitable' doctor warns*	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT M	*Deadly gas stored next door to South Bay homes*	Ultrahazardous Activities, Nuisance, IIED, § 1102.5
EXHIBIT N (SEPARATE PDF)	Modeling Toxic Gas Releases Using a Screening Model	Ultrahazardous Activities, Nuisance, IIED, § 1102.5

EXHIBIT NO.	RECORD DESCRIPTION	ASSOCIATED CLAIMS
EXHIBIT O (SEPARATE PDF)	International Fire and Zoning Code; California Fire Code *2021 IFC Code & Commentary Chapter. 27: Semiconductor Fabrication Facilities* *2021 International Zoning Code & Commentary Chapter 7: Factory/Industrial Zones* *2021 International Fire Code NFPA 704 Hazard Ratings by Hazard Categories* *2022 California Fire Code, Title 24, Part 9 with July 2024 Supplement Hazard Categories*	Ultrahazardous Activities, Nuisance, IIED, § 1102.5

APPENDIX: EXHIBITS

A. Exhibit: US EPA, RCRA Enforcement, 3250 Scott Blvd Inspection Report

Report attached as separate PDF "US EPA RCRA Enforcement Report, 3250 Scott Blvd."

The FOIA request to US EPA that provided the report:

REGION 9
SAN FRANCISCO, CA 94105

Ashley Gjovik
ashleymgjovik@protonmail.com

Re: Freedom of Information Act Request No. 2024-EPA-04320

Final Response

Dear Ashley Gjovik:

This letter concerns the above-referenced Freedom of Information Act (FOIA) request, received by the U.S. Environmental Protection Agency (EPA) on May 21, 2024, in which you requested the recent inspection report for RCRA compliance at 3250 Scott Blvd., in Santa Clara, California.

Final Response

EPA has now concluded its search for records responsive to your FOIA request. A portion of the record is available through the EPA FOIAXpress Public Access Link (PAL) at https://foiapublicaccessportal.epa.gov/.

To access the records, please go to the *Sign In* link in the upper right-hand corner of the PAL and log in to your FOIAXpress account, if you have one. If you are not a FOIAXpress user and want to create an account, please contact FOIA_HQ@epa.gov to request an account invitation email.

The records are also available in EPA's virtual public Reading Room. To access the records, select the *Reading Room* link at the top of the PAL. Enter "*04320" for the FOIA Case Number, click on *Search*, and locate the records associated with FOIA Request No. 2024-EPA-04320.

EPA is withholding information under Exemption 4 of the FOIA, 5 U.S.C. § 552(b)(4). EPA has determined that the withheld material may contain Confidential Business Information, which is exempt from disclosure under Exemption 4. Pursuant to 40 C.F.R. § 2.204(d)(1), your request is being initially denied, with respect to these portions of the records, because further inquiry by EPA is required before a final determination can be made.

B. Exhibit: Map: Location of 3250 Scott Blvd Santa Clara, CA, 95054.

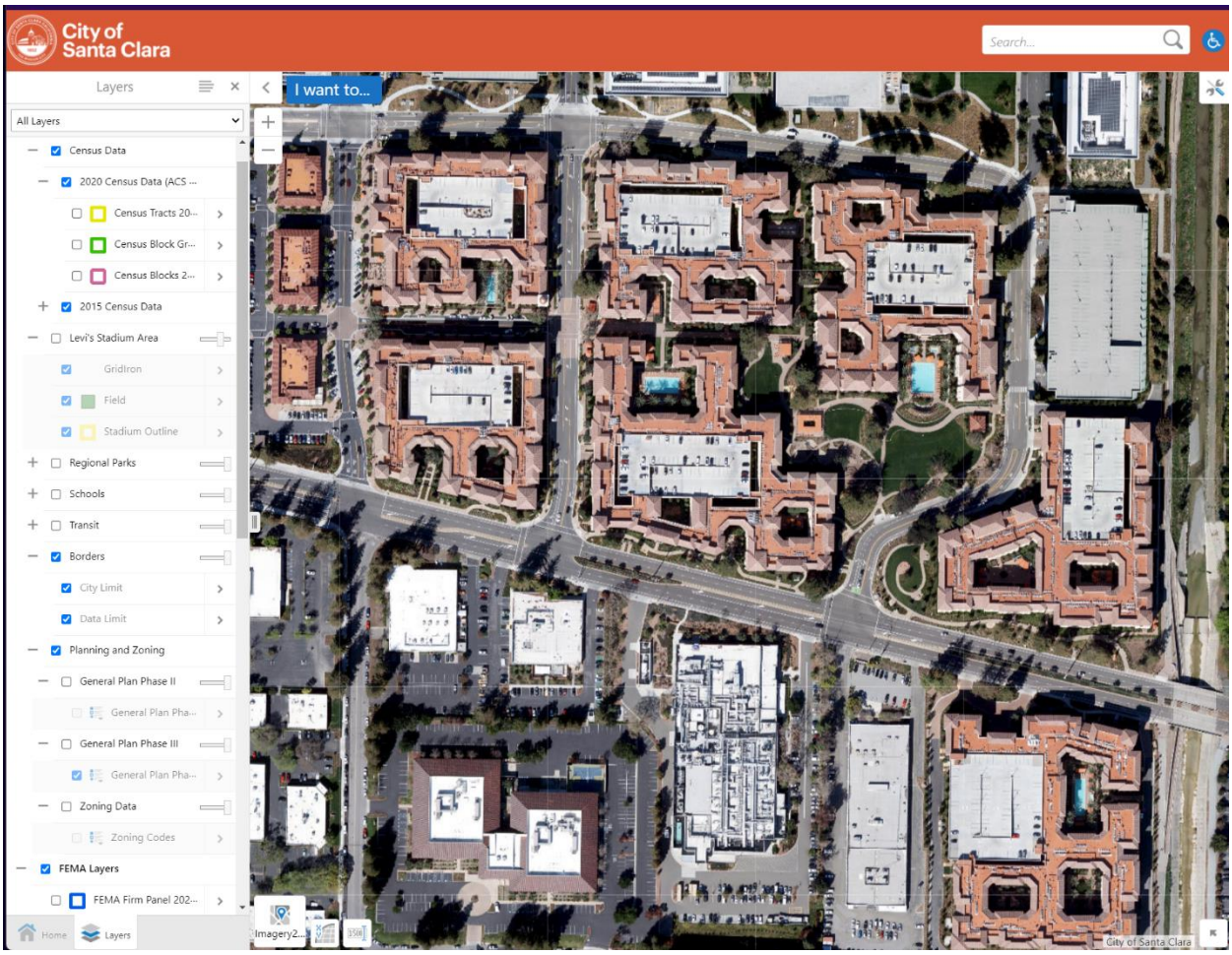


Figure 1: 3250 Scott Blvd, Santa Clara, California,
https://www.santaclaraca.gov/our-city/about-santa-clara/maps

Santa Clara County
Department of Planning and Development

Online Property Profile

COUNTY OF SANTA CLARA PLANNING OFFICE
70 W. HEDDING ST., SAN JOSE, CA 95110
(408) 299-5770

July 04, 2024 10:38:07 PM. The GIS data used in this analysis was compiled from various sources. While deemed reliable, the Planning Office assumes no liability.

Property Location Information

APN: **216-29-117**
Site Address: **3250 SCOTT BL SANTA CLARA CA 95054-3011**
Recorded Size (Assessor Database): **252,648 sq. ft. / 5.8 acres**
Computed Size (GIS): **255,171 sq. ft. / 5.9 acres**
TRA: **07014**

Planning and Development Information

APN:21629117 is incorporated (SANTA CLARA).
General Plan: **USA**
USA: **Santa Clara (100%)**
SOI: **Santa Clara**
Zoning: **INCORPORATED**
Supervisor District: **4**
Approved Building Site: **Research needed to evaluate parcel as a Building Site**

Special Area Policies and Information

- Fire Responsibility Area: LRA (100%)
- Geohazard: County liquefaction hazard zone
- Geohazard: State seismic hazard zone (liquefaction)
- Historic Parcel: NO
- FEMA Flood Zone: X (100%)
- Watershed: San Francisco Bay
- Rain isohyet: 13.5 inches

Nearest named creek: SAN TOMAS AQUINO CREEK (751 feet)
Nearest named lake: San Francisco Bay (10760 feet)

Figure 2: Santa Clara County Property Profile, https://clerkrecorder.sccgov.org/services-we-provide/assessor-property-address-search-apn-lookup

Figure 3: Google Maps Measure Distance (154 feet from building to building)

Figure 4: Google Maps Measure Distance (86 feet curb to curb)

C. Exhibit: "Hazardous Production Gases" (1986)

"Hazardous Production Gases: Part 2. Toxicity and Hazards," Semiconductor International, pg 231-233, May 1986.[1]

Hazardous Production Gases

Part 2. Toxicity and Hazards

Understanding the hazards of process gases is the responsibility of the engineer installing the fabrication system.

Richard A. Bolmen, Jr., Siliconix Inc., Santa Clara, Calif.

Of the myriad of chemicals used by semiconductor manufacturers during the production of integrated circuits, hazardous production gases are the least understood and present the highest potential risk to employees, production equipment and the surrounding community. Many of the semiconductor manufacturing processes are performed in a gaseous environment. The hazards of the gases range from very toxic, such as arsine, capable of producing lethal effects if inhaled at low part per million (ppm) concentrations, to corrosives, such as hydrogen chloride; capable of causing major equipment damage should an undetected leak occur in a wafer fab.[1,2]

All gases used by the semiconductor industry regardless of chemical or physiological classification, can be hazardous. In this article a gas is defined as a chemical that exists in a gaseous state at normal temperature and pressure (NTP) (70°F and 14.7 psia) or any chemical which in its liquid state exerts a vapor pressure >40 psia at 100°F.[3]

Gases used by the industry are supplied in both bulk and cylinder form. The bulk form includes nitrogen, hydrogen and oxygen (house gases) supplied generally from on-site bulk "cryogenic" or pipeline sources.

Most of the gases used in the industry are delivered in cylinders as compressed gases. A compressed gas is any material in a container exhibiting a pressure of 40 psia at 20°C or in excess of 104 psia at 54.5°C.[3] The sizes range from lecture bottles containing 2 ft³ to several hundred cubic feet with pressures ranging from 0.6 psia to 3000 psia.

Hazards of semiconductor gases

Semiconductor gases can be divided into the following hazard categories:

- flammable
- pyrophoric
- corrosive
- oxidizer
- toxic
- inert
- cryogenic

One of the problems of assessing the hazard potential of any one process gas is that for most of the gases there is no single hazard. For example, ammonia is a corrosive gas, however, it will burn at concentrations of 16 to 25% in air.[4] The Department of Transportation (DOT) also categorizes ammonia as a "nonflammable gas"[5] and as a "poison gas."[6]

Flammable gases

Any gas that will burn or explode in normal concentrations of air is considered flammable. Flammable gases are similar to flammable liquid vapors in that they will burn only within a specific range of gas-air mixture compositions (flammability range). The flammability range is expressed as a range of percentages; the lower percentage being the lower flammability or explosive level (LFL or LEL) and the higher percentage being the upper flammability or explosive level (UFL or UEL) (Table 1).

Pyrophoric gas

A pyrophoric gas is one that will spontaneously ignite when it comes in contact with air. The pyrophoric gases used most by the industry are phosphine sil-

Table 1. Flammable Semiconductor Process Gases[5,7,8,9]

Name	Chemical formula	Flammable limits lower-upper%	Ignition temp °C
Ammonia	NH_3	16-25%	651
Arsine	AsH_3	—	300 (decomp)
Carbon monoxide	CO	12.5-74%	609
Diborane	B_2H_6	1-88%	38-52
Dichlorosilane	SiH_2Cl_2	4.1-98.8%	100 (auto)
Germane	GeH_4	—	280 (Decomp)
Hydrogen	H_2	4-75%	585
Hydrogen sulfide	H_2S	4-44%	260
Phosphine	PH_3	Pyrophoric	40
Silane	SiH_4	Pyrophoric	375 (Decomp)

Table 2. Corrosive Process Gases[5,6,13,14]

Name	Chemical formula	Acid/ base	TLV	Additional hazards
Ammonia	NH_3	Base	25 ppm	Flammable
Boron trichloride	BCl_3	Acid	N/A	Toxic
Boron trifluoride	BF_3	Acid	1 ppm	—
Chlorine	Cl_2	Acid	1 ppm	Toxic/oxidizer
Dichlorosilane	SiH_2Cl_2	Acid	5 ppm (HCl)	Flammable Reactive
Hydrogen chloride	HCl	Acid	5 ppm	—
Phosphorus pentafluoride	PF_5	Acid	N/A	Toxic
Silicon tetrachloride	$SiCl_4$	Acid	5 ppm (HCl)	Reactive
Silicon tetrafluoride	SiF_4	Acid	N/A	Toxic

[1] Courtesy of: Santa Clara Center for Occupational Health (SCCOSH) and Silicon Valley Toxics Coalition (SVTC) Collection, MSS-2007-04-06, San José State University Library Special Collections & Archives.

ane and diborane. Silane also has demonstrated a powerful explosive potential and more recently this has been the subject of extensive study.[10] In 1984, Battelle Columbus Laboratories, in conjunction with two manufacturers and nine users, undertook a research project ("Taming of Silane") aimed at studying and characterizing the fire, explosion and oxidation chemistry of silane reactions.[11]

Through the efforts of the Semiconductor Equipment and Materials Institute (SEMI), the Semiconductor Safety Association (SSA) and several cylinder valve manufacturers, significant effort is being directed at the development of flow restrictor orifices and an overall redesign of cylinder valves and connections.[12]

Table 3. Toxic Semiconductor Process Gases[1,2,5,7,9,13]

Name	Chemical formula	TLV[1]	PEL[2]	IDLH[3]	Odor	Odor threshold
Arsine	AsH_3	0.05 ppm	0.05 ppm	6 ppm	garlic	1-2 ppm
Chlorine	Cl_2	1 ppm	1 ppm	25 ppm	pungent suffocating	1-4 ppm
Diborane	B_2H_6	0.1 ppm	0.1 ppm	40 ppm	sickly sweet	3-4 ppm
Germane	GeH_4	0.2 ppm	0.2 ppm	N/A	pungent odor	N/A
Phosphine	PH_3	0.3 ppm	0.3 ppm	200 ppm	decaying fish	2 ppm
Silane	SiH_4	0.5 ppm	0.5 ppm	N/A	repulsive	N/A
Stibine	SbH_3	0.1 ppm	0.1 ppm	N/A	garlic	N/A

1. TLV - Threshold Limit Value recommended by ACGIH is the concentration most workers can be exposed to without adverse effects. Also expressed as time-weighted average or ceiling value.
2. PEL - Permissable Exposure Limit. OSHA concentration limit expressed as time weighted average or ceiling value.

Corrosive gases

Corrosive gases can be subdivided into acids and bases and are characterized according to their ability to corrode, etch or "eat" wafers, equipment or tissue with which they come in contact.

Corrosive gases are upper respiratory irritants capable of burning the mucosa of the respiratory tract, the eyes and skin. Most of the corrosive gases used in the industry have good warning properties below a hazardous level and are not systemic poisons. An exception to this is anhydrous hydrogen fluoride (HF).

Anhydrous HF is 100% HF and is in a liquid form dispensed from gas cylinders at ambient pressure (<1 psia).

HF has poor warning properties, is toxic upon inhalation, and severely corrosive to the skin, eyes and mucous membranes. Inhalation exposures of HF at 50 ppm for 30-60 min may be fatal.[7] Acute effects vary with the concentration and time of exposure. Acute exposures can lead to severe eye and skin irritation, pulminary edema and cardiovascular collapse.[1,7]

HCl is an extremely corrosive gas and is particularly rough on gas regulators. An undetected HCl leak in a wafer fab can cause major equipment damage and the costs can potentially run in the millions. Regular preventive maintenance of HCl installations cannot be emphasized enough (Table 2).

Oxidizers

An oxidizer gas is one that can supply oxygen to a reaction causing a more violent, sometimes explosive, reaction of oxidation with other chemicals.[3] The most common oxidizers used by the industry are oxygen, nitrous oxide and chlorine. Chlorine is also classified as a toxic and is extremely corrosive.[8]

Toxic gases

Toxic or "poison" gases are used primarily as dopants in concentrations from low ppm to 100%. Of all the gases used, toxics represent the greatest hazard potential to employees and the surrounding community. Much of the recent legislation and city model ordinances have been targeted at toxics in an attempt to prevent a major gas incident from occurring.

Chemically, dopant gases are hydrides of arsenic, boron, silicon, phosphorus, germanium and antimony. The corresponding gases are arsine (AsH_3), diborane (B_2H_6), silane (SiH_4), phosphine (PH_3), germane (GeH_4) and stibine (SbH_3). All are either flammable or pyrophoric, and as a group have pungent odors and are extremely toxic[7] (Table 3).

Inert gases

Most inert gases have a very low order of chemical reactivity and toxicity while some, such as helium and argon, basically will not react with anything (Table 4). The hazard associated with inerts is that they can potentially displace enough oxygen in a room to cause asphyxiation and suffocation. Inert gases (He, Ar, N_2) are used primarily for three functions:

- as purge gases;
- as carrier gases; and
- as a diluent in compressed gas cylinders.

Flammability	Toxic effects: Acute	Toxic effects: Systemic	Lethal dose
white blue flame forms As_2O_3	headache dizziness weakness nausea	*hemolytic agent nerve/blood poison delay in symptoms	250 ppm/30 min
none	irritation/ burning of nose, throat and eyes	severe upper/lower respiratory irritant pulmonary edema	1000 ppm/1 min
pyrophoric	headache nausea weakness tightness in chest	tremors, convulsions respiratory irritant pulmonary edema	LC 50(rat): 50 ppm/4 hr
flammable	headache dizziness weakness nausea	hemolytic agent similar to arsine	similar to arsine (less toxic)
pyrophoric	headache nausea vomiting stomach cramps diarrhea	lungs, kidneys convulsions	2000 ppm/5 min
pyrophoric	headache nausea	N/A	N/A
burns in air forms antimony	headache dizziness weakness nausea	hemolytic agent similar to arsine	similar to arsine (more toxic)

3 IDLH - Immediately Dangerous to Life or Health. Airborne concentration of a gas that may be life threatening or pose serious risk or irreversible health effects on exposure for a 30 min duration. Onset of symptoms can take 24-48 hr for metal hydride.

Freons are used in plasma nitride systems. Plasma processes (non-aluminum) use inert gases (Freons in oxygen) and are capable of generating highly reactive ionic species as well as other hazardous species due to the high energy of the system.

The byproducts include free fluoride radicals which when pumped through the vacuum system combine with vacuum pump oil producing HF. This is an additional hazard that must be considered during preventive maintenance operations.

There is a tendency to overlook these hazards as the gases are fairly benign at the front end of the process. The assumption that hazardous end products are not produced is incorrect.

Table 4. Inert Semiconductor Process Gases[5,8,13]

Name	Chemical formula	TLV
Argon	Ar	None-asphyxiant
Freon 14**	CF_4	*N/A
Freon 23**	CHF_3	*N/A
Freon 116**	C_2F_6	*N/A
Helium	He_2	None-asphyxiant
Nitrogen	N_2	None-asphyxiant
Perfluoropropane	C_3F_8	*N/A
Sulfur hexafluoride	SF_6	1000 ppm

*Not available, TLV for other Freons established at 1000 ppm.
**Reactive in plasma nitride process due to fluoride radicle production.

Cryogens

A cryogenic gas is a liquified gas which exists in its container at temperatures far below normal atmospheric temperatures but usually slightly above its boiling point (−60°C to −270°C) at NTP and at corresponding low to moderate pressures.[3]

All of the cryogenics used by the industry are available and used as compressed gases as well, and hence share the same hazards. Hydrogen is flammable and has explosive potential as a compressed gas or a cryogenic liquid.

The primary hazards of cryogenic liquids are:

- exposure to living tissue (freezing),
- pressure buildup,
- fire/explosions,
- asphyxiation.

The frostbite/freezing hazards and associated tissue damage caused by exposure to a cryogen is comparable to that of boiling water or steam. The tremendous gas/liquid volume ratio (500-1000 ft^3 gas/ft^3 liq) of cryogenic liquids can cause rapid, explosive pressure changes of up to 40,000 psia in a closed container.[3] Because of this non-toxic, non-corrosive cryogens can release sufficient amounts of gas to present an asphyxiation potential through displacement of air (Table 5).

Recognizing and understanding all of the hazards associated with semiconductor process gases is crucial prior to implementation of administrative and engineering controls. This is not only the responsibility of the site health and safety professional but also that of the process and industrial engineer installing and using the system. The responsibility goes beyond, but is not exclusive to, the production staff. Maintenance of a safe environment for employees and surrounding communities requires an understanding of the hazards associated with process gases. □

References

1. N.H. Proctor and J.P. Hughes, "Chemical Hazards of the Workplace," J.B. Lippincott

D. Exhibit: "Silicon Valley toxics pose a 'Bhopal' peril" (1987).

"Silicon Valley toxics pose a 'Bhopal' peril," San Francisco Examiner, February 5 1987.[2]

WHY FEMINISTS SHOULD THANK SPORTS ILLUSTRATED/Page G-1

MIDDAY EDITION

San Francisco Examiner

Thursday, February 5, 1987

25c

Weather

Thursday night: Clear. Lows in the mid-30s. Friday: Mostly sunny, after patchy morning fog. Highs from the upper 60s to near 70. Details/Page B-2

Silicon Valley toxics pose a 'Bhopal' peril

Quake could cause gas rupture, endangering Santa Clara Valley

By Jane Kay
EXAMINER ENVIRONMENTAL WRITER

South Bay microelectronic companies store enough Bhopal-type toxic gases that a major release could jeopardize residents in the entire Santa Clara Valley, a new San Jose State report says.

"No community is adequately prepared to handle the major catastrophe that could result from the accidental rupture of a metal cylinder or pipe containing arsine gas," the report said.

"An earthquake of sizable magnitude could cause such a rupture in piping, and an accident in transportation or a fire could cause a major release of toxic gas," said the study, prepared for the Santa Clara County Fire Chiefs Association.

Many semiconductor firms, which use highly toxic gases such as arsine in the manufacture of silicon chips, are located near residential neighborhoods and schools and other public buildings.

The report was based on a study of 38 companies and the toxic gases they have on hand. The researchers used dispersion models approved by the Environmental Protection Agency to determine where the gases would go and in what concentrations if released under the worst meteorological conditions.

They concluded that virtually the entire Santa Clara Valley was the "immediate community" vulnerable to toxic-gas concentrations over safe levels in a major spill.

"If there was a situation where more than one went off at the same time, and there was no containment, then a major part of the area would be affected," said meteorologist Kenneth P. MacKay, one of three authors.

"I never heard of arsine when I started out," MacKay said. "When

— See TOXIC, A-18

State near 27 million in population

SACRAMENTO — California's population grew to nearly 27 million last year, as the state recorded its largest year-to-year numerical increase in more than four decades.

The bulk of the population jump came because an estimated 356,000 more people moved into the state than out, the largest net migration in 30 years.

The state also had 267,000 more births than deaths last year, its largest increase in history.

The nine-county Bay Area showed the lowest regional growth rate — just 1.4 percent — while the Gold Country counties in the northern Sierra Nevada grew at the fastest rate.

The number of people living in California reached 26,981,000 on July 1. That's 9 million more than the population of New York, the second-most-populous state.

The new figure represents an increase of 623,000, or 2.4 percent, over the 1985 total. Those new residents mark the largest one-year gain since the 1942-43 fiscal year, when the population increased 771,000, the state Department of Finance estimated.

The year-to-year change signaled an end to a trend begun in the 1970s, in which metropolitan counties grew at a slower rate than rural counties. The figures indicate that both metropolitan and rural areas grew by an average of 2.4

— See STATE, back page

TOXIC

-From A-1

e saw the results that it covered ıe whole valley, we were very sur-rised."

Of those studied, five companies ı the South Bay store enough ar-ne — only 15 pounds — that peo-le within 200 yards would be in nmediate danger of death in an ccident. Within 20 kilometers, resi-ents would get levels that endan-er health over longer periods of xposure.

The five are Raytheon in Moun-ain View, Advanced Micro Devices ı Sunnyvale, Exel in San Jose and 'recision Monoliths and Epitaxy in anta Clara.

Eight others pose dangers from rsine at least 100 yards and 10 kilo-neters away, the study said. These re Xerox and General Instruments n Palo Alto, Data General, Ad-anced Micro Devices and two Sig-ietics plants in Sunnyvale and Na-ional Semiconductor and Intel in anta Clara.

Inhaling arsine gas starts de-truction of red blood cells, accord-ng to occupational health expert Dr. Joseph LaDou at UC-San Fran-isco. Lives can be saved only hrough complete blood transfu-ions.

That means no community can expect to save lives in the event of widespread exposure to arsine or other toxic gases. Phosphine, anoth-er widely used gas, has no known antidote, survivors can suffer liver, kidney, heart and brain damage.

MacKay said he hadn't received any written comment on the con-clusions from industry representa-tives, who got an early report in November. Steve Pedersen of the Semiconductor Industry Associa-tion said he hadn't seen the report.

At Advanced Micro Devices, en-vironmental official Mike Gingras said. "When you're talking about a computer model as complicated as the one they used, and it assumes worst-case meteorology, what bear-ing does it have on the real world? You'd have to rupture the cylinder to get the type of release they're talking about. I don't know of that happening."

At Raytheon, Jeff Muscatine, communications manager, said: "We take great pains to handle the materials properly, and that's de-fined by both statute and many years of experience that many in-dustries have with these materials. I can't speculate on possible cata-strophic events. ... The major thrust of the industry is to use as little as possible."

Current laws don't regulate the maximum toxic-gas concentrations to which communities may be ex-posed or the treating of toxic ex-haust gas before releasing it to the environment.

After the 1984 accident in Bho-pal, India, where toxic gases killed 2,500 people and injured 200,000, the California Legislature directed Santa Clara County's fire chiefs to write a model regulatory ordinance for the rest of the state by July 1987.

Santa Clara County was chosen because it's in the heart of the Sili-con Valley, the largest cluster of semiconductor manufacturers in the nation.

The industry is the predominant user of such highly toxic or explo-sive gases as arsine, phosphine, di-borane, silane and chlorine, among the most dangerous materials used in making chips. Because the com-pressed gas is kept under pressure in canisters and cylinders, it is tricky to store and handle.

The politics of passing the ordi-nance have become quite heated since meetings began last April.

[redacted]

Now, the Semiconductor Indus-try Association is withholding sup-port of the ordinance, but Pedersen said the trade group preferred working to change the Uniform Fire Code. There, it has long held leverage in writing safety stan-dards.

[redacted]

That includes requirements for double containment of the gases, community notification of poten-tial health threats, emergency re-sponse plans, and mandatory evalu-ation of safer alternatives to the gases, he said.

[redacted]

The pioneer ordinance could af-fect as many as 1,000 Santa Clara businesses that store and use the gases.

The county was the first in the nation to write an ordinance to con-trol leaking underground tanks of solvents, primarily from the elec-tronics companies.

[2] Courtesy of: Santa Clara Center for Occupational Health (SCCOSH) and Silicon Valley Toxics Coalition (SVTC) Collection, MSS-2007-04-06, San José State University Library Special Collections & Archives.

E. Exhibit: ICSC for Toxic Gases

World Health Organization, IPCS INCHEM, International Chem Safety Cards for most common toxic gases used in semiconductor fabrication.

1. Arsine

IPCS INCHEM Home

ARSINE Arsenic trihydride Hydrogen arsenide Arsenic hydride	ICSC: 0222 (May 2018)
CAS #: 7784-42-1 UN #: 2188 EC Number: 232-066-3	

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Extremely flammable. Gas/air mixtures are explosive. Explosive.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding) if in liquid state. Do NOT expose to friction or shock.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out. In other cases extinguish with powder, carbon dioxide. In case of fire: keep cylinder cool by spraying with water. Combat fire from a sheltered position.

AVOID ALL CONTACT! IN ALL CASES CONSULT A DOCTOR!			
	SYMPTOMS	PREVENTION	FIRST AID
Inhalation	Abdominal pain. Confusion. Dizziness. Headache. Nausea. Shortness of breath. Vomiting. Weakness. Symptoms may be delayed. See Notes.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer immediately for medical attention.
Skin	ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves. Protective clothing.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer immediately for medical attention.
Eyes	ON CONTACT WITH LIQUID: FROSTBITE.	Wear face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	CLASSIFICATION & LABELLING
Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. NEVER direct water jet on liquid. Do NOT let this chemical enter the environment.	According to UN GHS Criteria  DANGER Contains gas under pressure; may explode if heated Extremely flammable gas Fatal if inhaled May cause cancer Causes damage to blood Transportation UN Classification UN Hazard Class: 2.3; UN Subsidiary Risks: 2.1
STORAGE	
Fireproof if in building. Cool. Ventilation along the floor.	
PACKAGING	

ARSINE **ICSC: 0222**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS COMPRESSED LIQUEFIED GAS WITH CHARACTERISTIC ODOUR.

Physical dangers
The gas is heavier than air and may travel along the ground; distant ignition possible. As a result of flow, agitation, etc., electrostatic charges can be generated.

Chemical dangers
Decomposes on heating and under the influence of light and moisture. This produces toxic arsenic fumes. Reacts with strong oxidants. This generates explosion hazard. May decompose explosively on shock, friction or concussion.

Formula: AsH_3
Molecular mass: 77.9
Boiling point: -62°C
Melting point: -116°C
Solubility in water, ml/100ml at 20°C: 20 (very slightly soluble)
Vapour pressure, kPa at 20°C: 1043
Relative vapour density (air = 1): 2.7
Flash point: Flammable gas
Explosive limits, vol% in air: 4.5-78

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation.

Effects of short-term exposure
Rapid evaporation of the liquid may cause frostbite. The substance may cause effects on the blood. This may result in destruction of blood cells. The effects may be delayed. Medical observation is indicated. See Notes. Exposure could cause death.

Inhalation risk
A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

Effects of long-term or repeated exposure
This substance is carcinogenic to humans.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 0.005 ppm as TWA

ENVIRONMENT

It is strongly advised not to let the chemical enter into the environment.

NOTES

The symptoms of poisoning do not become manifest until a few hours or even days have passed.
Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.
See ICSC 0013.

ADDITIONAL INFORMATION

EC Classification

See Also:
Toxicological Abbreviations
Arsine (PIM 044)

2. Phosphine

IPCS INCHEM Home

PHOSPHINE Phosphorus trihydride Hydrogen phosphide	ICSC: 0694 (April 2013)
CAS #: 7803-51-2 **UN #: 2199** **EC Number: 232-260-8**	

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Extremely flammable. May ignite spontaneously on contact with air. Gives off irritating or toxic fumes (or gases) in a fire. Gas/air mixtures are explosive.	NO open flames, NO sparks and NO smoking. NO contact with hot surfaces. Closed system, ventilation, explosion-proof electrical equipment and lighting.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out. In other cases extinguish with powder, carbon dioxide. In case of fire: keep cylinder cool by spraying with water. Combat fire from a sheltered position.

AVOID ALL CONTACT! FIRST AID: USE PERSONAL PROTECTION. IN ALL CASES CONSULT A DOCTOR!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Headache. Dizziness. Nausea. Diarrhoea. Chest pain. Shortness of breath. Irregular heartbeat. Convulsions. Unconsciousness.	Use closed system or ventilation.	Fresh air, rest. Half-upright position. Administration of oxygen may be needed. Artificial respiration may be needed. Refer immediately for medical attention.
Skin	ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves. Protective clothing.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention .
Eyes	ON CONTACT WITH LIQUID: FROSTBITE.	Wear face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion		Wash hands before eating.	

SPILLAGE DISPOSAL	CLASSIFICATION & LABELLING
Evacuate danger area! Consult an expert! Ventilation. Personal protection: chemical protection suit including self-contained breathing apparatus.	**According to UN GHS Criteria**  **DANGER** Extremely flammable gas Contains gas under pressure; may explode if heated Fatal if inhaled Causes severe skin burns and eye damage **Transportation** **UN Classification** UN Hazard Class: 2.3; UN Subsidiary Risks: 2.1
STORAGE	
Fireproof. Keep in a well-ventilated room.	
PACKAGING	

International Labour Organization World Health Organization

Prepared by an international group of experts on behalf of ILO and WHO, with the financial assistance of the European Commission.

European Commission

PHOSPHINE **ICSC: 0694**

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS COMPRESSED LIQUEFIED GAS.

Physical dangers
The gas is heavier than air and may travel along the ground; distant ignition possible.

Chemical dangers
Decomposes on heating and on burning. This produces toxic fumes including phosphorus oxides. Reacts violently with air, oxygen, oxidants such as chlorine oxides, nitrogen oxides, metal nitrates, halogens and many other substances. This generates fire and explosion hazard. Attacks many metals.

Formula: PH_3
Molecular mass: 34.00
Boiling point: -87.7°C
Melting point: -133°C
Relative density (water = 1): 0.8
Density (gas): 1.53 kg/m³
Solubility in water, ml/100ml at 17°C: 26 (very poor)
Vapour pressure, kPa at 20°C: 3488
Relative vapour density (air = 1): 1.18
Flash point: Flammable gas
Auto-ignition temperature: 38°C
Explosive limits, vol% in air: 1.6 - 100 (estimated)

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation.

Effects of short-term exposure
The substance is severely irritating to the respiratory tract. Inhalation of this gas may cause lung oedema. See Notes. Rapid evaporation of the liquid may cause frostbite. The substance may cause effects on the central nervous system, cardiovascular system, heart, gastrointestinal tract, liver and kidneys. This may result in impaired functions. Exposure above the OEL could cause unconsciousness and death. Medical observation is indicated.

Inhalation risk
A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

Effects of long-term or repeated exposure
Non-specific complaints like gastrointestinal disorders, headache, nausea etc. may occur.

OCCUPATIONAL EXPOSURE LIMITS

TLV: 0.05 ppm as TWA; (ceiling value): 0.15 ppm as STEL; A4 (not classifiable as a human carcinogen).
MAK: 0.14 mg/m^3, 0.1 ppm; peak limitation category: II(2); pregnancy risk group: C.
EU-OEL: 0.14 mg/m^3, 0.1 ppm as TWA; 0.28 mg/m^3, 0.2 ppm as STEL

ENVIRONMENT

This substance does enter the environment under normal use. Great care, however, should be taken to avoid any additional release, for example through inappropriate disposal.

NOTES

Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.
The technical product often ignites spontaneously at room temperature because of the presence of other phosphorus hydrides, especially diphosphine (CAS:13445-5-6) as impurities.
Odourless when pure at concentrations up to 200 ppm (278 mg/m^3) (a highly toxic level).
Technical product has odour of garlic or decaying fish due to impurities.
The odour warning when the exposure limit value is exceeded is insufficient.
The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.
Immediate administration of an appropriate inhalation therapy by a doctor, or by an authorized person, should be considered.

ADDITIONAL INFORMATION

EC Classification
Symbol: F+, T+, N; R: 12-17-26-34-50; S: (1/2)-28-36/37-45-61-63

See Also:
Toxicological Abbreviations

3. Stibine

IPCS INCHEM Home

STIBINE Antimony hydride Antimony trihydride Hydrogen antimonide	**ICSC: 0776 (November 2008)**
CAS #: 7803-52-3 **UN #: 2676**	

	ACUTE HAZARDS	**PREVENTION**	**FIRE FIGHTING**
FIRE & EXPLOSION	Extremely flammable. Gives off irritating or toxic fumes (or gases) in a fire. Gas/air mixtures are explosive. Risk of fire and explosion on contact with ozone or nitric acid.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out. In other cases extinguish with water spray. In case of fire: keep cylinder cool by spraying with water. Combat fire from a sheltered position.

AVOID ALL CONTACT! IN ALL CASES CONSULT A DOCTOR!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Cough. Sore throat. Headache. Weakness. Laboured breathing. Nausea. Weak and irregular pulse. Hemoglobinuria.	Use closed system or ventilation.	Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer immediately for medical attention.
Skin	ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer immediately for medical attention.
Eyes	Redness.	Wear eye protection in combination with breathing protection.	Rinse with plenty of water (remove contact lenses if easily possible). Refer immediately for medical attention.
Ingestion			

SPILLAGE DISPOSAL	**CLASSIFICATION & LABELLING**
Remove all ignition sources. Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Ventilation.	**According to UN GHS Criteria**
STORAGE	
Fireproof. Cool.	**DANGER** Extremely flammable gas Fatal if inhaled May cause damage to respiratory tract and blood if inhaled
PACKAGING	**Transportation** **UN Classification** UN Hazard Class: 2.3; UN Subsidiary Risks: 2.1

International Labour Organization
World Health Organization
Prepared by an international group of experts on behalf of ILO and WHO, with the financial assistance of the European Commission.

European Commission

STIBINE	ICSC: 0776

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS COMPRESSED GAS WITH PUNGENT ODOUR.

Physical dangers
The gas is heavier than air and may travel along the ground; distant ignition possible.

Chemical dangers
Decomposes slowly at room temperature. Decomposes quickly at 200°C. This produces metallic antimony and hydrogen. This increases fire hazard. Reacts violently with chlorine, concentrated nitric acid and ozone. This generates fire and explosion hazard.

Formula: SbH_3
Molecular mass: 124.8
Boiling point: -18°C
Melting point: -88°C
Relative density (water = 1): 2.26 (-25°C)
Solubility in water: poor
Relative vapour density (air = 1): 4.4
Flash point: Flammable gas

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation.

Effects of short-term exposure
Rapid evaporation of the liquid may cause frostbite. The substance is severely irritating to the respiratory tract. The substance may cause effects on the blood. This may result in destruction of blood cells. Exposure above the OEL could cause death. Medical observation is indicated.

Inhalation risk
A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

Effects of long-term or repeated exposure

OCCUPATIONAL EXPOSURE LIMITS

TLV: 0.1 ppm as TWA

ENVIRONMENT

NOTES

Explosive limits are unknown in literature, although the substance is combustible and has a flash point < 61°C.
Depending on the degree of exposure, periodic medical examination is suggested.
The relation between odour and the occupational exposure limit cannot be indicated.

ADDITIONAL INFORMATION

EC Classification
Symbol: Xn, N; R: 20/22-51/53; S: (2)-61; Note: A, 1

See Also:
Toxicological Abbreviations

4. Fluorine

IPCS INCHEM Home

FLUORINE	ICSC: 0046 (October 2001)
CAS #: 7782-41-4 UN #: 1045 EC Number: 231-954-8	

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Not combustible but enhances combustion of other substances. Many reactions may cause fire or explosion. Risk of fire and explosion on contact with many substances. See Chemical Dangers.	NO contact with water, combustible substances or reducing agents.	NO water. In case of fire in the surroundings, use appropriate extinguishing media. See Notes. In case of fire: keep cylinder cool by spraying with water. NO direct contact with water. Combat fire from a sheltered position. See Notes.

AVOID ALL CONTACT! IN ALL CASES CONSULT A DOCTOR!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Burning sensation. Cough. Sore throat. Shortness of breath. Laboured breathing. Symptoms may be delayed. See Notes.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention.
Skin	Redness. Pain. Skin burns. ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves. Protective clothing.	First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again. Refer for medical attention .
Eyes	Redness. Pain. Severe deep burns.	Wear face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion			

SPILLAGE DISPOSAL	CLASSIFICATION & LABELLING
Evacuate danger area! Consult an expert! Personal protection: gas-tight chemical protection suit including self-contained breathing apparatus. Ventilation.	**According to UN GHS Criteria**
STORAGE	**Transportation** **UN Classification** UN Hazard Class: 2.3; UN Subsidiary Risks: 5.1 and 8
Fireproof if in building. Cool.	
PACKAGING	

International Labour Organization
World Health Organization
Prepared by an international group of experts on behalf of ILO and WHO, with the financial assistance of the European Commission.

European Commission

FLUORINE	ICSC: 0046

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
YELLOW COMPRESSED GAS WITH PUNGENT ODOUR.

Physical dangers
The gas is heavier than air.

Chemical dangers
The substance is a strong oxidant. It reacts with combustible and reducing materials. Reacts violently with water. This produces toxic and corrosive vapours of ozone (see ICSC 0068) and hydrogen fluoride (see ICSC 0283). Reacts violently with ammonia, metals, oxidants and many other materials. This generates fire and explosion hazard.

Formula: F_2
Molecular mass: 38.0
Boiling point: -188°C
Melting point: -219°C
Solubility in water: reaction
Relative vapour density (air = 1): 1.3

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation.

Effects of short-term exposure
The substance is very corrosive to the eyes, skin and respiratory tract. Inhalation of this gas may cause lung oedema. See Notes. The liquid may cause frostbite. The effects may be delayed. Medical observation is indicated.

Inhalation risk
A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

Effects of long-term or repeated exposure

OCCUPATIONAL EXPOSURE LIMITS

TLV: 1 ppm as TWA; 2 ppm as STEL.
EU-OEL: 1.58 mg/m^3, 1 ppm as TWA; 3.16 mg/m^3, 2 ppm as STEL

ENVIRONMENT

NOTES

Reacts violently with fire extinguishing agents such as water.
The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort.
Rest and medical observation are therefore essential.
Immediate administration of an appropriate inhalation therapy by a doctor, or by an authorized person, should be considered.
Do NOT spray water on a leaking cylinder (to prevent corrosion of the cylinder).
Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.

ADDITIONAL INFORMATION

EC Classification
Symbol: T+, C; R: 7-26-35; S: (1/2)-9-26-36/37/39-45

See Also:
Toxicological Abbreviations

5. Diborane

IPCS INCHEM Home

DIBORANE	ICSC: 0432 (April 2006)
Boroethane Boron hydride Diboron hexahydride	
CAS #: 19287-45-7 **UN #: 1911** **EC Number: 242-940-6**	

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Extremely flammable. Gas/air mixtures are explosive. Risk of explosion on contact with water.	NO open flames, NO sparks and NO smoking. NO contact with halogens, oxidizing agents or water. NO contact with hot surfaces. Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Use non-sparking handtools.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out. In other cases extinguish with dry powder. NO hydrous agents. In case of fire: keep cylinder cool by spraying with water. NO direct contact with water. Combat fire from a sheltered position.

STRICT HYGIENE! IN ALL CASES CONSULT A DOCTOR!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Cough. Sore throat. Nausea. Laboured breathing. Dizziness. Weakness. Headache. Fever. Tremor. Symptoms may be delayed. See Notes.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention.
Skin	Frostbite. Frostbite.	Cold-insulating gloves.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention .
Eyes	Severe deep burns.	Wear safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	CLASSIFICATION & LABELLING
Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Ventilation. Remove all ignition sources. Turn off gas at source if possible.	**According to UN GHS Criteria**  **DANGER** Extremely flammable gas Contains gas under pressure; may explode if heated Fatal if inhaled Causes severe skin burns and eye damage Causes damage to respiratory system if inhaled
STORAGE	
Fireproof. Separated from strong oxidants, food and feedstuffs and water. Cool. Ventilation along the floor and ceiling. Dry.	
PACKAGING	

DIBORANE	ICSC: 0432

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS COMPRESSED GAS WITH CHARACTERISTIC ODOUR.

Physical dangers
The gas mixes well with air, explosive mixtures are easily formed.

Chemical dangers
The substance polymerizes. This produces liquid pentaborane. Reacts violently with oxidants. Decomposes rapidly on heating. This produces hydrogen, boric acid and boric oxide.

Formula: B_2H_6/BH_3BH_3
Molecular mass: 27.7
Boiling point: -92°C
Melting point: -165°C
Solubility in water: hydrolyzes to hydrogen and boric acid
Vapour pressure, kPa at 25°C:
Relative vapour density (air = 1): 0.96
Flash point: Flammable gas
Auto-ignition temperature: 40-50°C
See Notes.
Explosive limits, vol% in air: 0.8-88

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation. Serious local effects on contact with skin.

Effects of short-term exposure
The substance is corrosive to the eyes, skin and respiratory tract. Inhalation may cause lung oedema. See Notes. The effects may be delayed. Exposure could cause death.

Inhalation risk
A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

Effects of long-term or repeated exposure
Inhalation may cause asthma-like reactions (RADS).

OCCUPATIONAL EXPOSURE LIMITS

TLV: 0.1 ppm as TWA

ENVIRONMENT

Environmental effects from the substance have not been investigated adequately.

NOTES

The presence of contaminants may lower the auto-ignition temperature so that ignition may occur at or below room temperature.
Reacts violently with fire extinguishing agents such as water.
The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort.
Rest and medical observation are therefore essential.
The odour warning when the exposure limit value is exceeded is insufficient.
Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.

ADDITIONAL INFORMATION

EC Classification

See Also:
Toxicological Abbreviations

6. Silane

IPCS INCHEM Home

SILANE	ICSC: 0564 (July 1997)
Monosilane Silicon tetrahydride Silicane	
CAS #: 7803-62-5 **UN #: 2203** **EC Number: 232-263-4**	

	ACUTE HAZARDS	PREVENTION	FIRE FIGHTING
FIRE & EXPLOSION	Extremely flammable. Gas/air mixtures are explosive.	NO open flames, NO sparks and NO smoking. Closed system, ventilation, explosion-proof electrical equipment and lighting.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out. In other cases extinguish with powder, carbon dioxide. Combat fire from a sheltered position.

STRICT HYGIENE!			
	SYMPTOMS	**PREVENTION**	**FIRST AID**
Inhalation	Cough. Headache. Nausea. Sore throat.	Use ventilation, local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
Skin	Redness. ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Rinse skin with plenty of water or shower.
Eyes	Redness. Pain.	Wear safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.
Ingestion			

SPILLAGE DISPOSAL	CLASSIFICATION & LABELLING
Evacuate danger area! Consult an expert! Personal protection: self-contained breathing apparatus. Ventilation. Remove gas with fine water spray.	**According to UN GHS Criteria**
STORAGE	**Transportation** **UN Classification** UN Hazard Class: 2.1
Fireproof.	
PACKAGING	

International Labour Organization World Health Organization

Prepared by an international group of experts on behalf of ILO and WHO, with the financial assistance of the European Commission.

European Commission

SILANE	ICSC: 0564

PHYSICAL & CHEMICAL INFORMATION

Physical State; Appearance
COLOURLESS GAS WITH CHARACTERISTIC ODOUR.

Physical dangers
The gas is heavier than air.

Chemical dangers
The substance may ignite spontaneously on contact with air. Decomposes on heating and on burning. This produces silicon and hydrogen. This generates fire and explosion hazard. The substance is a strong reducing agent. It reacts violently with oxidants. Reacts with potassium hydroxide solution and halogens.

Formula: SiH_4
Molecular mass: 32.1
Boiling point: -112°C
Melting point: -185°C
Solubility in water: slow reaction
Relative vapour density (air = 1): 1.3
Explosive limits, vol% in air: 1.37-100

EXPOSURE & HEALTH EFFECTS

Routes of exposure
The substance can be absorbed into the body by inhalation.

Effects of short-term exposure
The substance is irritating to the eyes, skin and respiratory tract. Rapid evaporation of the liquid may cause frostbite.

Inhalation risk
A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

Effects of long-term or repeated exposure

OCCUPATIONAL EXPOSURE LIMITS

TLV: 5 ppm as TWA

ENVIRONMENT

NOTES

ADDITIONAL INFORMATION

EC Classification

See Also:
Toxicological Abbreviations

F. Exhibit: San Jose Mercury News, LSI LOGIC advertisement.

LSI LOGIC advertisement, San Jose Mercury News (July 15 1996).[3]

LSI LOGIC

LSI Logic Corporation has operated its semiconductor manufacturing facility in an industrial zone of Santa Clara since 1983. We have long committed ourselves to maintaining a safe environment for our employees and the surrounding community, and we believe strongly in being good neighbors. That's why LSI Logic is vehemently opposed to locating elementary schools and day-care centers in industrial areas where dangerous chemicals are in constant use.

In 1993, a narrow majority of the Santa Clara City Council allowed a private elementary school to locate on an industrially zoned site at 3003 Scott Boulevard, within 300 feet of LSI Logic's semiconductor manufacturing facility—a facility which uses toxic, corrosive and flammable chemicals on a daily basis. Scott Boulevard and the surrounding streets are heavily used by chemical delivery trucks and hazardous waste disposal vehicles serving LSI Logic and other industrial sites in the vicinity.

For obvious reasons, we would never dream of locating a semiconductor factory next to an existing school. That's why it makes no sense to place a school next to an existing factory—especially in an area where earthquakes are a constant threat. In fact, the private elementary school was granted its conditional use permit over the objections of the City of Santa Clara Planning Commission, the Santa Clara Fire Department and the Bay Area Air Quality Management District. The San Jose Mercury News also has editorialized against the school's industrially zoned site. The school's location violates the Santa Clara General Plan and triggers enforcement of burdensome regulatory requirements that have been enacted by the state and local governments to protect the well-being of school children.

We are extremely proud of our safety record at LSI Logic. Our Santa Clara facility has installed state-of-the-art hazardous materials storage, secondary containment, monitoring and treatment systems. We also maintain emergency response teams trained to handle a wide variety of emergencies, including chemical spills, earthquakes and electrical fires. But the fact remains that accidents happen, and the long-term protection of neighboring school children, who cannot evacuate themselves during an emergency, cannot be guaranteed. **In fact, since 1984, the Santa Clara Fire Department has responded to 36 hazardous material accidents within a 1,000-foot radius of the private elementary school's present location.**

LSI Logic believes that school children should not be exposed to such risks. There are five alternative schools available in safe, non-industrially zoned areas of the community. Please call the Santa Clara City Council at **(408) 984-3250** and tell its members that schools should be located in areas zoned for children—not hazardous chemicals.

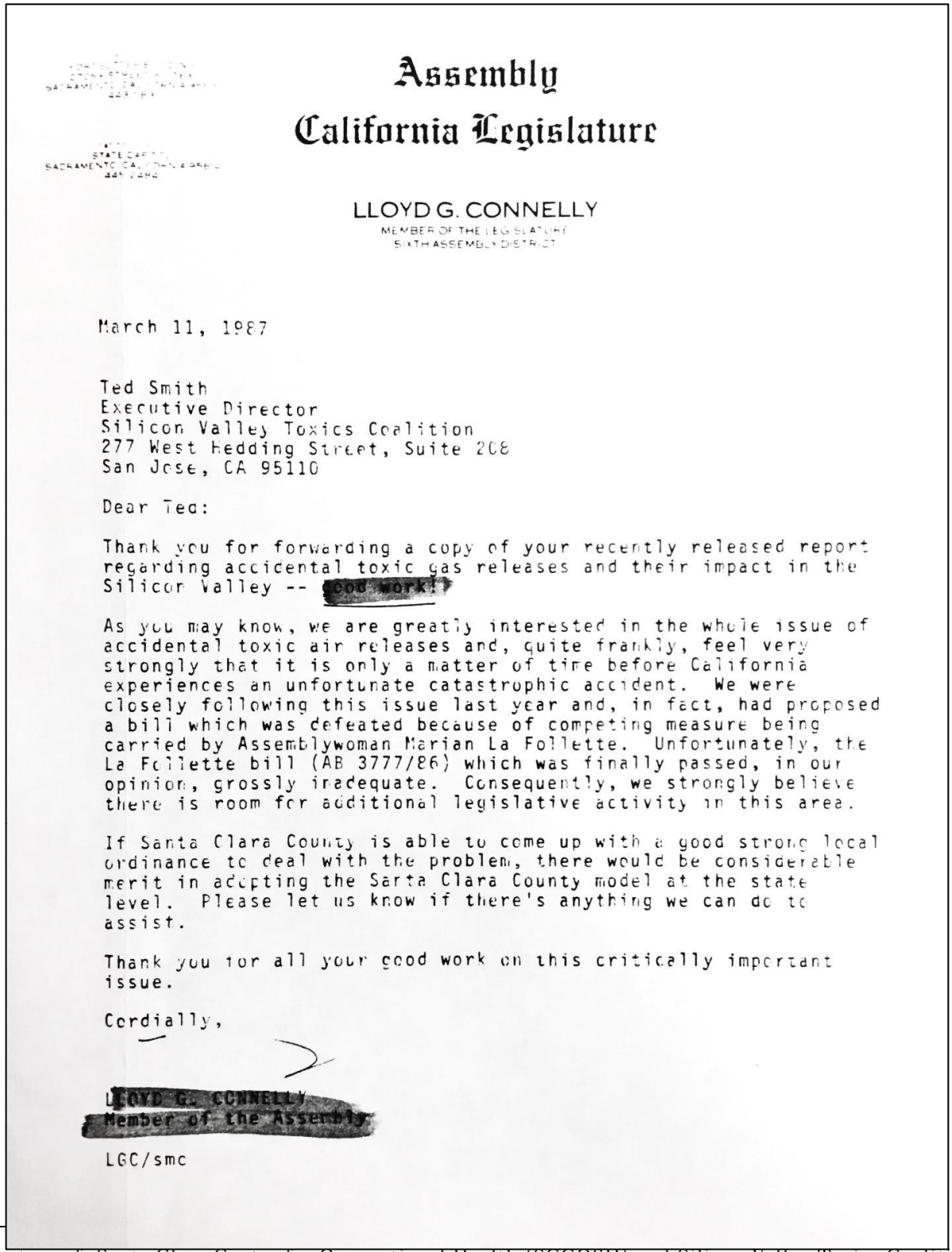
Sincerely,

Wilfred J. Corrigan
Chairman and Chief Executive Officer
LSI Logic Corporation

[3] Courtesy of: Santa Clara Center for Occupational Health (SCCOSH) and Silicon Valley Toxics Coalition (SVTC) Collection, MSS-2007-04-06, San José State University Library Special Collections & Archives.

G. Exhibit: Letter from California Assemblymember Lloyd G. Connelly (1987)

Letter from California Assemblymember Lloyd G. Connelly to Silicon Valley Toxics Coalition, March 11, 1987. [4]



Assembly
California Legislature

LLOYD G. CONNELLY
MEMBER OF THE LEGISLATURE
SIXTH ASSEMBLY DISTRICT

March 11, 1987

Ted Smith
Executive Director
Silicon Valley Toxics Coalition
277 West Hedding Street, Suite 208
San Jose, CA 95110

Dear Ted:

Thank you for forwarding a copy of your recently released report regarding accidental toxic gas releases and their impact in the Silicon Valley -- good work!

As you may know, we are greatly interested in the whole issue of accidental toxic air releases and, quite frankly, feel very strongly that it is only a matter of time before California experiences an unfortunate catastrophic accident. We were closely following this issue last year and, in fact, had proposed a bill which was defeated because of competing measure being carried by Assemblywoman Marian La Follette. Unfortunately, the La Follette bill (AB 3777/86) which was finally passed, in our opinion, grossly inadequate. Consequently, we strongly believe there is room for additional legislative activity in this area.

If Santa Clara County is able to come up with a good strong local ordinance to deal with the problem, there would be considerable merit in adopting the Santa Clara County model at the state level. Please let us know if there's anything we can do to assist.

Thank you for all your good work on this critically important issue.

Cordially,

LLOYD G. CONNELLY
Member of the Assembly

LGC/smc

[4] Courtesy of: Santa Clara Center for Occupational Health (SCCOSH) and Silicon Valley Toxics Coalition (SVTC) Collection, MSS-2007-04-06, San José State University Library Special Collections & Archives.

H. Exhibit: "Warning to Silicon Valley on computer chip gases" (1987)

"Warning to Silicon Valley on computer chip gases," The New York Times, February 8 1987.[5] See Report in Exhibit N.

SACTO Bee 2/8/87

State News

Warning to Silicon Valley on computer chip gases

By Katherine Bishop
New York Times

SAN FRANCISCO — A new report has warned that the high-technology area south of here is not prepared for a "catastrophe" that could result from a major release of highly toxic gases in an earthquake, fire or traffic accident.

The report by researchers at San Jose State University said materials used in the manufacture of silicon chips could menace the health of people within a dozen miles of a plant in the event of an accident or a natural disaster.

A major concern is over the release of arsine, a highly poisonous, inflammable gas that is stored by manufacturers of computer chips. The gas destroys red blood cells and is fatal within a short time of exposure in very high concentrations, the researchers say.

The report found that five companies in the Silicon Valley 50 miles south of here stored enough arsine to endanger the health of people within a 12.5-mile radius if they breathed the gas for several hours in the event of a major release of arsine into the atmosphere.

"We drew circles out from the storage sites and they covered virtually the entire valley," said Dr. Kenneth P. MacKay, a San Jose meteorology professor who helped write the report.

The five companies listed in the report are Raytheon in Mountain View, Advanced Micro Devices in Sunnyvale, Exel in San Jose and Precision Monoliths and Epitaxy, both in Santa Clara.

Eight other plants store arsine in quantities that could affect people within a six-mile radius of a leak, said the report, which based its calculations on the Environmental Protection Agency's air pollution dispersion models.

> 'We drew circles out from the storage sites and they covered virtually the entire valley'
>
> **— Kenneth MacKay, a report writer**

They are Xerox and General Instruments, both in Palo Alto; Data General, Advanced Micro Devices and two plants of Signetics, all in Sunnyvale; and Intel and National Semiconductor in Santa Clara.

The report was prepared for the Silicon Valley Toxics Coalition, which is made up of environmental groups and labor unions in the area that are seeking to reduce the use of hazardous chemicals in the workplace.

Toxic gases such as arsine and phosphine are added to pure silicon, a derivative of sand, to give the semiconductor chips their electrical properties. They are normally stored in compressed gas cylinders in high concentrations.

Michael Belliveau of the Citizens for a Better Environment, a national group, said 30 minutes of exposure to arsine at a concentration of 25 parts per million is fatal.

The report also warned of potential toxic gas hazards that are not related to the semiconductor industry such as chlorine, which is stored in large quantities at sewage-treatment plants and other locations.

The Silicon Valley Toxics Coalition plans to use the report to support its arguments in favor of specially designed containment buildings for storing the toxic gases, neighborhood emergency warning systems in case a leak occurs and requirements that companies develop computer models to show how leaking gas would be dispersed so residents could avoid exposure in an emergency.

The issues are being raised now because the Santa Clara County Fire Chiefs' Association is drafting a model ordinance to regulate the storage and handling of toxic gases in the valley. The final version is be presented to state officials July 1.

Steven W. Pedersen, the director of environmental affairs for the Semiconductor Industry Association, a trade group representing about 50 companies in the valley, said that many companies already comply with standards being devised for the national Uniform Fire Code regarding the handling of toxic materials.

These include monitoring, automatic shut-off of leaky valves and routing of gases through treatment systems, but they do not include the dispersion models sought by the toxics coalition.

[5] Courtesy of: Santa Clara Center for Occupational Health (SCCOSH) and Silicon Valley Toxics Coalition (SVTC) Collection, MSS-2007-04-06, San José State University Library Special Collections & Archives. Also published at: ***Study Warns of Electronics-Area Catastrophe***, New York Times, 1987, https://www.nytimes.com/1987/02/08/us/study-warns-of-electronics-area-catastrophe.html

I. Exhibit:" Activist calls semiconductor industry history's most dangerous"

"Activist calls semiconductor industry history's most dangerous," The Oregonian (1984). [6]

Activist calls semiconductor industry histo

Associated Press

FIGHTER — Typewriter at the ready. Gayle F. Southworth takes a break at his home in Berkeley, Calif. Southworth worries that exposure of workers to chemicals in the semiconductor industry is dangerous.

Story on Page C1 also

By SPENCER HEINZ
of The Oregonian staff

The semiconductor industry is the most dangerous business in history, says Gayle F. Southworth.

Southworth is an activist who is spreading some downbeat concerns in California's Silicon Valley, heart of America's high-tech semiconductor industry.

As the director of a non-profit educational and informational clearinghouse in San Jose called the Santa Clara Center for Occupational Safety and Health, Southworth charges that the semiconductor industry and government are doing woefully little to inform and protect workers.

He says the EPA's glycol ether alert is significant only because that agency so far has done little or nothing to investigate potential dangers with many other deadly acids, solvents and gases used by semiconductor workers.

"In fact, prior to that hazard alert coming out, they were widely regarded as among the most benign of the chemicals used by the industry," he said of glycol ethers.

"It is one of the most dangerous of all industries in the history of humanity. Even though it has the image of a clean and light industry, the people who work in it are exposed daily and repeatedly to incredibly dangerous chemicals," Southworth said.

A former research director for the Service Employees International Union in San Jose, Southworth moved to his present job in 1980, one year after the Santa Clara Center was founded by representatives of unions, womens' organizations and some electronics industry workers. The reported annual budget is about $45,000 a year, which pays salaries and operating costs for Southworth and an associate, Pat Lamborn, who said operating money comes mostly from unions and "social justice foundations."

"We exist to educate and organize workers themselves," Lamborn said. "Workers themselves have to be informed because it is in their best interests to safeguard their own health. No one else will do it for them."

Southworth calls attention to an article in the current issue of Technology Review magazine, which says the industry has an unusually high incidence of occupational illnesses. The article says the California Department of Industrial Relations found, in a 1980 survey, that the industry has 1.3 illnesses per 100 workers, compared with 0.4 per 100 workers for general manufacturing industries — or more than three times as many.

Southworth claims the industry is safe only on paper, that it engages in semantics to avoid full reporting of cases, and that the semiconductor company health clinics normally are not staffed full time by persons well versed in toxicology.

"These company clinics systematically give bad medical advice," he said. "They tell people, 'Don't worry about this chemical. It's not dangerous.' And they say this about very dangerous chemicals."

Asked what semiconductor executives think of him, Southworth said they tend to dismiss him simply as a union organizer — a characterization that he rejects — in a industry without unions.

The director of the Semiconductor Industry Association in San Jose, Thomas D. Hinkelman, echoed that description of Southworth and said the semiconductor industry is one of the safest.

In fact, his trade association said in a news release this week that the U.S. Bureau of Labor Statistics ranks the semiconductor industry "among the safest manufacturing operations in the nation for 1982."

The trade association said semiconductor manufacturing posted an "occupational injury and illness rate" of only 3.8 cases per 100 workers for the year.

"Only 'Guided Missiles and Space Vehicles' and 'Typewriter' manufacturing had better records," the statement said.

Regarding the study cited in Technology Review, Hinkelman dismissed the numbers as having been "discredited" by follow-up reports.

Smack in the center of this emerging dialogue, Southworth emphasized that he does not pretend to be objective in an area that he believes cries out for action.

He said it is difficult — just as it was with asbestos for many years — to prove that semiconductor industry chemicals are directly reponsible for some worker illnesses.

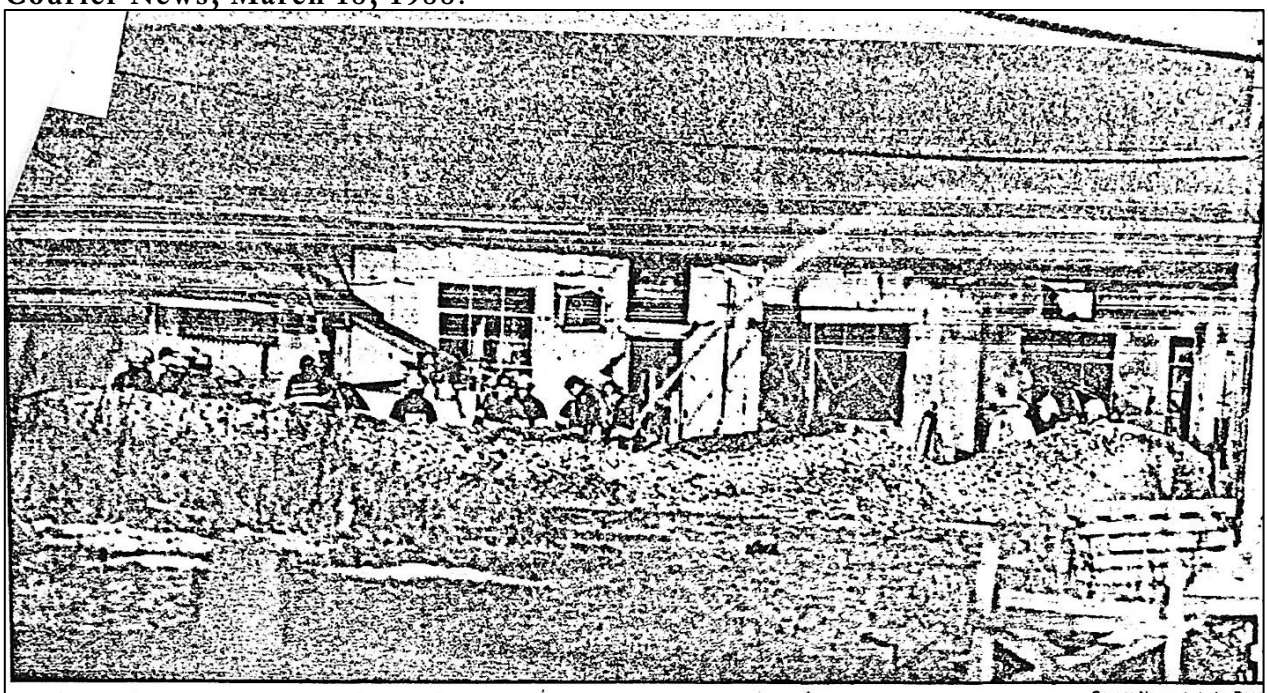
But he claims the government is susceptible to political pressure from the the multibillion-dollar industry, and that little is likely to change unless some people presume the worst is happening and make waves.

"We're worker advocates," he said. "I guess I have a little bit of difficulty with people who express 'scientific objectivity' in this field. While they're accumulating data, morgues are accumulating bodies."

[6] Courtesy of: Santa Clara Center for Occupationa
(SVTC) Collection, MSS-2007-04-06, San José State University Library Special Collections & Archives.

J. Exhibit: "Blast scene 'pretty brutal'" (1988)

"Blast scene 'pretty brutal': Firefighters pull screaming victim from explosion site," Courier News, March 18, 1988. [7]



Courier-News photo by Dean

Firefighters battle a smoky fire after several explosions hit a research company in Berkeley Heights early yesterday.

Blast scene 'pretty brutal'

Firefighters pull screaming victim from explosion sit

By ROBIN SIDEL
Courier-News Staff Writer

BERKELEY HEIGHTS — Ed Delia, Joe Imbimbo and Art Scholl didn't think twice before rushing in to save a man screaming for help at the site of an explosion yesterday.

The three members of Berkeley Heights Volunteer Fire Co. were the first to arrive at the scene after an explosion wracked the Gollob Analytical Services research firm on Industrial Road at 1:51 a.m.

Shortly after their arrival, they saw James Diemer of Leonia waving his arms and screaming for help.

"The building was engulfed with flames and we were taking the hoses out when we heard him," Imbimbo, 27, said. "At first we saw all the cylinders, but didn't see any people."

The firefighters said Diemer was leaning against several helium cylinders in a small penned-in area outside the main building.

"It's more than a miracle that he was aware and conscious of what was happening," Delia, 23, a carpenter, said. "He sounded like he was fine."

"If anybody had seen this man, they would have gone in to get him. You can't think about the danger."

Courier News 3/18/88

Art Scholl
Berkeley Heights volunteer firefighter

The firefighters ran to Diemer and tried to carry him away from the site, but realized he was entangled in rubber tubing attached to the helium cylinders.

"I could tell right away that there was something wrong with his (left) leg," said Imbimbo, who added that Diemer's pants were blown off by the explosion. Diemer had suffered a large gash in his right leg.

After six hours of surgery, surgeons at University Hospital in Newark amputated the lower half of Diemer's left leg and gave him a good prognosis for recovery. He was listed in critical condition this morning.

The firefighters said Diemer kept telling them that there were three other men with him at the time of the explosion. Those men — Louis Molinini, Steve Carvellas and an as yet unidentified third person — were killed.

Imbimbo and Delia first heard the explosions when they still were at home. Moments later, they headed toward the site.

The fire continued to roar around the firefighters as they rescued Diemer and tried to locate the other victims.

"It was pretty brutal," Imbimbo, a mechanic, said. "We weren't sure if it was going to blow again."

"It was a real mess — a real tragedy," Delia added.

Despite their fears of additio explosions, the three firefighte said they had no second thoug about helping Diemer.

"If anybody had seen this m they would have gone in to him," said Scholl, a 46-year-old gineering manager for an Orad firm. "You can't think about danger."

Although the three are trying avoid thinking about the dang they still are disturbed by the gr scene they found at the site. T three firefighters said they wou have trouble sleeping. Scholl ev went to work after the accide just to take his mind off what h occurred.

"I never went to Vietnam, b now I feel like I've been there Scholl said. "It made me reali how fragile the human body is.

"I've never seen anything li this," Delia said. "I just don't li to think about it."

Delia also said he was hesita about talking about the accide because "I'm not one for makin big deal of myself. I don't want be thought of as 'Joe Hero.'"

[7] Courtesy of: Santa Clara Center for Occupational Health (SCCOSH) and Silicon Valley Toxics Coalition (SVTC) Collection, MSS-2007-04-06, San José State University Library Special Collections & Archives.

K. Exhibit: "Residents flee homes in fear of new blast" (1988)

"Residents flee homes in fear of new blast," Courier News, March 19 1988.[8]

Courier News 3/19/88

Residents flee homes in fear of new blast

By PAT POLITANO
Courier-News Staff Writer

BERKELEY HEIGHTS — As many as 1,500 township residents were evacuated from a half-mile radius of Gollob Analytical Research last night because of a threat of toxic gases from the chemical research company, site of a Thursday explosion.

Berkeley Heights Mayor Jeffrey Maccarelli said numerous businesses, 40 to 100 homes and a nursing home were cleared by more than 700 emergency personnel who poured into the township after Police Chief Ralph Del Duca declared an emergency at 7:15 p.m. yesterday.

Officials offered no estimate of when residents might be allowed to return home. "This is an adventure that's going to last another few days," said Township lawyer Frank Capece.

Environmental officials feared that containers of toxic gas at Gollob could be ruptured by an explosion from a cylinder of gas that has been burning for more than 48 hours.

Three men died and a fourth was severely injured at about 2 a.m. Thursday when a chemical container they were handling exploded at the company on Industrial Road.

A Department of Environmental Protection spokesman said the explosion apparently was caused by a contaminated chemical container believed to have been rejected as dangerous by a customer of a second company that took the container to Gollob for testing.

Dennis A. Feeney, general manager of the second company, Liquid Carbonics Specialty Gas Corp., has been tentatively identified as the third man killed in Thursday's explosion. Louis Molinini, a founder of Gollob, and Steve Carvellas, a Gollob employee from Easton, Pa. were killed in the blast.

Inside

The area evacuated was roughly bounded by the intersections of Springfield and Snyder avenues to the north, Park and Berkeley avenues to the west, Russo Place and Locust Avenue to the east and Webster Drive to the south.

Officers went door to door notifying residents to leave and businesses to close, and state police roadblocks closed every street into the evacuation area.

Those who had no place to stay were sent to Governor Livingston Regional High School for temporary shelter.

The American Red Cross in Summit delivered cots to the school and helped set up the shelter.

Authorities issued a call to rescue squads throughout Union County for ambulances to help evacuate 115 people from the Berkeley Heights Convalescent Center.

Rescue squads responding included New Providence, Summit, Passaic Township, Scotch Plains, Rahway, Roselle, Clark, Cranford, Hillside, and Milburn.

State Police Superintendent Col. Clinton L.

☐ See EVACUATION on Page A-4

[8] Courtesy of: Santa Clara Center for Occupational Health (SCCOSH) and Silicon Valley Toxics Coalition (SVTC) Collection, MSS-2007-04-06, San José State University Library Special Collections & Archives.

L. Exhibit: "Toxic gas leak is 'inevitable' doctor warns," (1982)

"Toxic gas leak is inevitable doctor warns: Dangerous form of arsenic is used in electronics industry," Mercury News (1982)[9]

Toxic gas leak is 'inevitable,' doctor warns

Dangerous form of arsenic is used in electronics industry

By Susan Yoachum
Staff Writer

A deadly form of arsenic widely used in the electronics industry poses "a serious risk to the community," says one of Santa Clara County's leading occupational-health physicians.

Arsine gas, the most toxic form of arsenic, is essential to the county's industry because it helps impart electrical properties to the silicon chips that are the building blocks of the computer age. If inhaled, arsine can cause death by destroying the kidneys' functions.

'Major hazard'

Arsine and other toxic chemicals used by the electronics industry present "a major environmental, as well as occupational hazard" both outside and inside electronics plants, Dr. Joseph La Dou said Friday.

La Dou, medical director of the Peninsula Industrial Medical Clinic in Sunnyvale, was addressing a group of health experts meeting in San Francisco.

"In the event of an earthquake, the leak of these gases would be enormous," La Dou said. Even without an earthquake, he said, a "major leak of arsine gas" is an "inevitable" occurrence.

The Peninsula Industrial Medical Clinic is one of a handful of occupational-health clinics in the county that contract with the electronics industry to treat workers' injuries and illnesses.

La Dou, who has written studies on employee abuse of the workers' compensation system, is regarded as a conservative physician not known for making alarmist predictions.

Unprepared

But in his speech at the University of California conference, La Dou said not only that a major toxic gas leak is inevitable, but also that it probably would catch the community unprepared.

"Everything (La Dou) said sounds reasonable," said Chuck Elkind, vice president of the American Electronics Association, a nationwide organization of 1,800 companies, which is based in Palo Alto.

But Elkind said he would like to see La Dou and the medical community raise their concerns with the companies.

Mel Knight, an environmental-health specialist in the state Department of Health Services' division that oversees the handling of toxic substances, also said he did not disagree with La Dou's statements.

"He's quite possibly correct," Knight said. "In general, there are indeed some areas where we don't have tight regulations: We don't have control over raw products, because they're not hazardous waste."

'Nearly impossible'

"There's so much raw product used in so many ways that it's nearly impossible to get a handle on it," Knight said.

In his speech, La Dou criticized current methods of transporting and storing exotic, toxic gases such as arsine and phosphine, a derivative of phosphorus that can irritate the lungs.

Every year, he said, there are 68,000 cubic feet of arsine trucked into Santa Clara County, along with more than a third of a million cubic feet of phosphine.

"Those are enormous quantities of materials being carted on the Bayshore by some of the most rickety trucks," La Dou said. "Had the Caldecott Tunnel disaster been a truck full of diborane, phosphine and arsine instead of (gasoline), I'm sure if we were capable of reading, we'd still be reading about that particular spill."

Storing toxic and hazardous gases, acids and solvents is another major problem, La Dou said.

No outward signs

La Dou said that appearances may be deceiving. The fronts of low-slung electronics factories show no smokestacks or other outward signs of a polluting industry.

La Dou said a visitor to the back of the plants sees the sometimes haphazard storage of dangerous materials. Toxic chemical containers often are free-standing, instead of being stored in an enclosed facility, he said.

"The electronics industry is an enormously important industry for our future development," La Dou said. "It is an industry troubled by health and safety issues that are going unanswered."

Mercury News, Sunday morning, June 6, 1982 Section B

[9] Courtesy of: Santa Clara Center for Occupational Health (SCCOSH) and Silicon Valley Toxics Coalition (SVTC) Collection, MSS-2007-04-06, San José State University Library Special Collections & Archives.

M. Exhibit: "Deadly gas stored next door to South Bay homes" (1986).

"Deadly gas stored next door to South Bay homes," San Francisco Examiner, August 10, 1986. [10]

San Francisco Examiner

Sunday, 10 August 1986

Deadly gas stored next door to South Bay homes

By Jane Kay
EXAMINER ENVIRONMENTAL WRITER

MOUNTAIN VIEW — Across the street from a company that packages canisters of deadly gases potent enough to kill people blocks away within minutes of a leak, children splash in a front-yard plastic swimming pool.

Next door to the children, David Noble, for seven years a resident in the comfortable green-lawn neighborhood that borders on the clean industrial park, says no one from Air Products and Chemicals Co. has ever approached his family about the possibility of an accident or evacuation.

Yet firefighters and occupational health experts say that considering the large volumes of gases used in the semiconductor industry, an accident is not only possible but can be expected.

Mountain View is one of a dozen Bay Area cities that are home to companies that either supply or commonly use the toxic gases arsine, phosphine, diborane, germane, boron trichloride, hydrogen chloride and chlorine in increasing quantities every year.

And no community is adequately prepared to handle a major disaster that would result from the rupture of a metal cylinder containing arsine gas, according to a recently released report.

To meet the need, a model ordinance that would bring tighter controls on the storage and handling of toxic gas is being written by firefighters, including two Ph.D. chemists in the Silicon Valley.

Noble says he has never had any problems or noticed any odors from the Mountain View plant at 465 Whisman St.: "All we get is a terrific smell of garlic from Gilroy."

But the smell could be caused by a very low release from across the street of arsine gas, the most toxic form of arsenic, and not from Gilroy, more than 25 miles away.

The chief of meteorology at the Bay Area Air Quality Management District said he has never heard anyone even speculate about the Gilroy garlic odor reaching Mountain View. The farthest north it's been tracked is at the IBM plant in south San Jose, he said.

Officials at Air Products, one of the major suppliers of compressed gas to the semiconductor industry, including Rich Steiner, district manager at Mountain View, were unavailable to discuss plant safety. A spokesman did say, however, that the company considered safety "a critical issue" and would address the matter, including its plans, later this week.

While some minute concentrations of arsine are allowed under occupational standards, a canister leak could be disastrous, industry and health officials agree.

A compressed gas cylinder containing 200 cubic feet of 10 percent arsine gas that was accidentally vented to the environment would create 10,000 cubic feet of lethal gas for about 10 minutes.

The amount of fresh air needed to dilute the release of a small 20-pound cylinder of phosphine gas to a safe level would cover 276 city blocks and be 10 feet high.

"No industry in history has created so great a demand for arsine gas as the semiconductor industry, yet the risk to communities and workers is seldom discussed with candor," Dr. Joseph LaDou, acting chief of the Division of Occupational Medicine at UC-San Francisco School of Medicine, said in a recently published paper.

Four years ago, LaDou, then concerned about a potential for a large-scale calamity, estimated that nearly 70,000 cubic feet of arsine had been delivered that year to Santa Clara County businesses.

Two doctors, Peter Wald and

[10] Courtesy of: Santa Clara Center for Occupational Health (SCCOSH) and Silicon Valley Toxics Coalition (SVTC) Collection, MSS-2007-04-06, San José State University Library Special Collections & Archives.

N. Exhibit: "Modeling Toxic Gas Releases Using a Simple Screening Model," (1987).

Report attached as separate PDF "*Exhibit: Modeling Toxic Gas Releases*"

"Modeling Toxic Gas Releases Using a Simple Screening Model," by Kenneth P. MacKay and David Sweet, Department of Meteorology, and James Zavagno, Department of Urban Planning, San Jose State University – for Silicon Valley Toxics Coalition and Santa Clara County Fire Chief's Association (1 February 1987).[11]

Also available in: *Transportation of Hazardous Materials:* Hearings Before the Subcommittee on Surface Transportation of the Committee on Public Works and Transportation, House of Representatives, One Hundred First Congress, First Session, page 349, May 5, 1989 (Cambridge, OH); May 15, 1989 (San Jose, CA); June 5, 1989.

See news coverage in Exhibit H.

[11] Courtesy of: Santa Clara Center for Occupational Health (SCCOSH) and Silicon Valley Toxics Coalition (SVTC) Collection, MSS-2007-04-06, San José State University Library Special Collections & Archives.

O. Exhibit: International Fire Code; International Zoning Code; California Fire Code

Documents attached in separate PDF "*Exhibit: International Fire and Zoning Code*"

Contents:

- **2021 IFC Code & Commentary:** Chapter. 27: Semiconductor Fabrication Facilities, Section 2701, General
- **2021 International Zoning Code & Commentary:** Chapter 7: Factory/Industrial Zones
- **2021 Fire Code Essentials:** Based on the 2021 International Fire Code: Chapter 16 General Requirements for Hazardous Materials
- **2022 California Fire Code,** Title 24, Part 9 with July 2024 Supplement: Appendix E Hazard Categories